

STUDIES IN CYPERACEAE IN SOUTHERN AFRICA: 7. *CYPERUS PROLIFER* LAM. A CASE OF MISTAKEN IDENTITY

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ABSTRACT

A review of the history of the names *C. prolifer* Lam. and *C. isocladius* Kunth revealed that *C. isocladius* Kunth should be regarded as a synonym of *C. prolifer* Lam. and that much of the S.A. material hitherto identified as *C. isocladius* Kunth is more correctly assigned the name *C. prolifer* Lam.

UITTREKSEL

STUDIES VAN CYPERACEAE IN SUIDELIKE AFRIKA: *CYPERUS PROLIFER* LAM. 'N GEVAL VAN IDENTITEITSVERGISSING.

'n Historiese ondersoek van die name *C. prolifer* Lam. en *C. isocladius* Kunth dui aan dat *C. isocladius* Kunth 'n sinoniem van *C. prolifer* is, en dat meeste van die Suid-Afrikaanse versamelings voorheen bekend as *C. isocladius* Kunth, werklik *C. prolifer* is.

Clarke (1897), in a footnote to his description of *Cyperus isocladius* Kunth, commented that “*C. prolifer* Lam. (*C. aequalis* Vahl), is a frequent plant in SE. Tropical Africa and the Mascarene Islands, and has the stem trigonous or nearly terete at the top. From this *C. isocladius* only differs in its triquetrous stem.” He remarked further that, while Boeckeler may be justified in regarding these two as synonyms, he preferred to retain them as separate taxa. Certainly, it is evident that the growing collection of sedges from Natal and Zululand includes two taxa which are conveniently identified as “*C. prolifer*” and “*C. isocladius*” on the basis of Clarke’s description and key, but the measure of doubt evident in Clarke’s comments and the somewhat anomalous situation of the epithet “*prolifer*” applied to material which did not exhibit proliferations, prompted a careful review of the literature to establish the criteria on which these two should be distinguished.

C. prolifer Lam. was described on the basis of a collection by Joseph Martin from Mauritius. The holotype is a single flowering culm, without underground portions, bearing a dense, spherical umbel with an estimated 161 inflorescence rays most of which terminate in depauperate spikelets. Proliferating spikelets and at least two leafy proliferations from the axils of involucre bracts are present.

The description is brief, but includes two salient features “culmo triquetro” and “spiculis proliferis”. The description of culm shape was undoubtedly prompted

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Accepted for publication 28th November, 1975.



FIG. 1.
The holotype of *Cyperus prolifer* Lam. (ex Paris).

by a note “culmo triquetro” which was certainly written by the collector, Joseph Martin (Raynal, 1970, personal communication), and in the French description is translated as a “tige trigone”. It is not possible to assess the true shape of the culm in the original herbarium sheet and we must accept the collector’s and author’s opinions that the culm was three-angled.

Vahl (1806), citing Lamarck’s reference and specimen, emphasized the relative lengths of the umbel branches by using the epithet “aequalis” thus drawing attention to the equal rays. Poiret (1806) also cited Lamarck’s reference and specimen and again referred to “triangular” culms, but called the taxon *C. papyroides*.

There were, therefore, three epithets applied to a single taxon which was characterized by many equal rays, proliferations and leafless culms described as “triquetro” (that is three-angled with acute angles and concave faces), in the Latin description and “triangular to three-angled” in the French translations. It is perhaps in this minute difference that subsequent confusion and divergence of opinion arose, for in 1837, Kunth in descriptions of the culms, distinguished between *C. aequalis* (citing *C. prolifer* Lam. and *C. papyroides* Poir. as synonyms) and *C. isocladius* Kunth principally on features of culm shape. Kunth regarded the culm of *C. aequalis* as roughly terete or bluntly trigonous and that of *C. isocladius* as triquetrous – ironically the very term Lamarck used in the protologue of *C. prolifer*. This character has subsequently been used as the distinction between *C. isocladius* and *C. prolifer* or *C. aequalis* in all the later classifications.

A careful review of this early literature and a comparison of terms, illustrations, the type of *C. prolifer* Lam. and an isotype of *C. isocladius* Kunth prompts the following observations.

C. prolifer Lam., though it was given a very brief protologue, cannot be rejected in favour of a more preferable epithet. Thus Vahl’s epithet “aequalis” and Poiret’s “papyroides”, though appropriate, descriptive and evocative, are, by the present code of nomenclature, invalid.

C. prolifer Lam. is clearly described as having triquetrous stems and, therefore, Kunth’s decision to separate *C. isocladius* from *C. prolifer* on this very feature cannot be justified and *C. isocladius* must be relegated to a synonym. This opinion was most particularly reinforced when the isotype of *C. isocladius* was examined in Paris Herbarium and proved to exhibit the spherical multi-rayed umbel characters of *C. prolifer* Lam. as well as a triangular to triquetrous culm.

It is obvious that Kunth (1837) was aware of variation in culm shape in this taxon. In his opinion, the differences between the extremes of expression warranted specific recognition. In our opinion, even if such a distinction was warranted, the name *C. prolifer* Lam. should have been retained for that moiety with triquetrous stems.

In tracing subsequent taxonomic treatments it becomes apparent that when

variation of culm shape is accorded significance at specific level, Kunth's distinction between a triquetrous-culmed *C. isocladius* and a trigonous-culmed *C. prolifer* was gradually modified until the epithet "*prolifer*" became associated with terete-culmed specimens and "*isocladius*" applied to those with triquetrous culms.

Boeckeler (1862–4) accepted *C. aequalis* Vahl without referring to synonyms, but he placed *C. isocladius* Kunth as a variety of *C. aequalis*. In his study of *C. aequalis* Vahl, Boeckeler (1862–4) described the culm as "terete below, a little compressed to evidently trigonous or triquetrous at the apex". Boeckeler succinctly remarked that stem shape was unreliable. This pertinent observation was either overlooked or not followed up in later work and this variation in culm shape is very probably the reason for much of the nomenclatural confusion in this taxon.

Clarke (1883) recorded *C. aequalis* Vahl from Madagascar and retained this name in subsequent works (1884), but in 1885 included *C. prolifer* Lam. and *C. isocladius* Kunth in *Conspectus Florae Africae*. Discrepancies in the identification of cited specimens when compared with Kükenthal's citations reflect the difficulties and ambiguities in the character separating these two taxa.

Clarke (1883, 1884) referred to *C. aequalis* Vahl, but in 1895 more correctly used the older valid name *C. prolifer* Lam. In this *Conspectus*, however, he also included *C. isocladius* Kunth suggesting that he followed Kunth in distinguishing the two species.

Clarke (1897) expressed doubt about the validity of a distinction between *C. isocladius* and *C. prolifer*, but as has been shown above, regarded *C. prolifer* as the correct name for the specimens with round or terete culms. This, of course, entirely contradicts Lamarck's original description. Kükenthal (1936) although recognizing these two taxa as varieties and not species, still retained the association of the epithet "*prolifer*" with plants with terete culms. Kükenthal's illustration of *C. prolifer* Lam. is of particular interest for it bears a remarkable resemblance to the type specimen of *C. prolifer* and is unmistakably of the same phenotype as plants from South African collections erroneously identified as *C. isocladius* Kunth.

The undue emphasis on a single, and we believe, variable feature has caused a metamorphosis in the circumscription of the characters of *C. prolifer* Lam. which began by being described as having triquetrous culms, but which is now regarded as having terete culms.

After examining the type specimens of *C. prolifer* Lam. and *C. isocladius* Kunth (and living populations in Natal and Mauritius), and studying the descriptions in chronological order, tracing the gradual modifications and changes in emphasis, we have concluded that *C. isocladius* Kunth must be regarded as a synonym of *C. prolifer* Lam. If, after due consideration of all morphological features, a second taxon is to be recognized, it should be given a new epithet.

Cyperus prolifer Lam., Tab. Encycl. Meth. Bot. **1**: 147 (1791); Schum. in Engl., Pflanzenr. Ost-Afr. C: 119 (1895); Clarke in Dur. & Schinz, Consp. Fl. Afr. **5**: 572 (1895); in Dyer Fl. Cap. **7**: 176 (1897) and in Fl. Trop. Afr. **8**: 339 (1901); Kükenthal in Engl., Pflanzenr. **101**: 11, 256–7 (1936); Koyama in J. Taiwan Mus. **XIV** (3, 4): 174–5 (1961) Type: “Insula Franciae” (Mauritius), *Jos Martin* 474 (P!)

C. papyroides Poir., Encycl. **VIII**: 270 (1806) ex herb. Lam.

C. aequalis Vahl Enum. Pl. **11**: 320 (1806); Roem. and Schult. Syst. Veg. **11**: 179 (1817); Spreng., Syst. Veg. **1**: 220 (1825); Kunth, Enum. Pl. **2**: 37 (1837); Krauss in Flora **28**: 754 (1845); Steud., Synops. Pl. **2** (7): 22 (1855); Boeck. in Peters Reise Mossamb. Bot. **11**: 538 (1862–4); in Linnaea **XXXV**: 557–8 (1868) and in Abh. Naturw. Ver. **7**: 37 (1880–2); Bak. in Fl. Maurit. 412 (1877); Clarke in Journ. Linn. Soc. Lond. **XX**: 287 (1883) and **XXI**: 123 (1884); Chermesz. in Ann. Mus. colon. Marseille **XXX**. 3. Sér. vol. **X**: 12 (1922) and in Humbert Fl. Madag. **11**: 69 (1937) ex herb. Lam. *Papyrus aequalis* Bojer in Hort. Maurit. 381 (1837) ex herb. Lam.

C. isocladus Kunth., Enum. Pl. **2**: (1837); Drège & E. Mey., Zwei Pflanzen. Doc. 177 (1843) (as “jocladus”); Drège & E. Mey., l.c. 155, 157 (1843) (as “iocladus”); Steud., Synops. Pl. **2** (7): 22 (1855); Clarke in Dur. & Schinz. Consp. Fl. Afr. **5**: 565 (1895); in Dyer Fl. Cap. **7**: 175 (1897) and in Fl. Trop. Afr. **8**: 339 (1901) Type: “Omsamwubo et Omsamcaba” (Cape Province), *Drège* 4431b (isotype P!)

C. esculentus Drège & E. Mey., Zwei Pflanzen. Doc. 177 (1843) non L. sensu stricto. (*Drège* 4431b.)

Perennial, erect or nodding, 23–105 cm high, in large clumps: *rhizome* horizontal, rarely vertical, ligneous; *internode* 0,6–3,1 × 0,2–0,6 cm, clothed by many-nerved, red-brown, persistent sheaths; *leaves* limited to sheaths; *sheaths* 4,5–26,5 × 0,4–2,4 cm, glabrous, many-nerved, nerves converging at apex, margin of mouth scarious; *blades* generally absent: *culms* triquetrous to terete, mainly triangular, glabrous: *inflorescence bud* ovoid, up to 4,6 cm long; *involucral bracts* 3, subtending rays, not exceeding inflorescence; *inflorescence* 5,6–18 × 5–15,5 cm; *rays* 101–259, umbellate, up to 16 cm long, forming reflex angle with culm apex, sheathed at base by tubular prophylls, 0,9 cm long; *capillary rays* occasional; *ray receptacle* globose: *spikelets* 1–30 per ray, 6–17 × 1–1,5 mm, generally flat, elliptic to narrowly ovate, yellow-brown to red-brown, darkening on drying and age: *rhachilla* straight, yellow-brown: *glumes* lowermost 1–3 sterile, remainder fertile, 1,2–1,7 × 0,2–0,4 mm, broadly ovate, base truncate, glabrous, yellow-brown, margin scarious, keel three-nerved, central nerve excurrent into mucron, 0,1 mm long: *stamens* 3; *anthers* 1,2 × 0,2 mm, yellow-brown, crested; *filament* as long as anther, pallid, with small red-brown markings: *style* 0,3 mm long, pale yellow-brown; *style branches* three, 1,2 mm long, dark brown, papillate: *achene* 0,4 × 0,2 mm, obovate, trigonous in transverse section; *outermost*



FIG. 2.

A recent gathering of *Cyperus prolifer* Lam. from the South Coast of Natal.

cells rectangular, with markedly sinuous margins. Flowering period November to May inclusive.

KENYA—Kwale district: Shimba hills, Mkadara, -7.1939, *Someren 18* (K); Matuga, -11.1961, *Bogdan 5352* (K); Lama district, Marrarani, Boni Forest, 1961, *Gillespie 364* (K); Tanga district, Mombasa Waterworks. -1.1934, *Gibson 5* (K).

TANZANIA—Bagamoyo district, Mapinga, -12.1915, *Peter 14812* (K); Ndago, Bana Forest Reserve, -8.1968, *Shabani 166* (K); Kilwa district, Kilwa, -6.1932, *Schlieben 2353* (K); Lushoto district, Masinde, -8.1937, *Greenway 5142* (K); Manga district, -7.1960, *Haerdi 5830* (K); Mikindani district, -3.1963, *Richards 17790* (K). Rufiji district, Mafia Island, -3.1933, *Wallace 830* (K); Usaramo district, Dar-es-Salaam, -6.1966, *Wheeler Haines 4188* (K); near Dar-es-Salaam, -11.1915, *Peter 14854* (K); Kurasini, -2.1971, *Batty 1234* (K). ZANZIBAR ISLAND—-1847, *Boivin s.n.* (K); -4.1867, *Kirk s.n.* (K); -9.1868, *Kirk s.n.* (K); -9.1873, *Hildebrandt 1006* (K); -4.1892 *Sacleux 1823* (K); -9.1894, *Kuntze 206* (K); -1.1929 *Greenway 1175* (K); -1931, *Vaughan 1259* (K); 1863 (K); -8.1950, *Williams 59* (K).

PEMBA ISLAND—Kinazini, -3.1952, *Williams 135* (K).

MOÇAMBIQUE—Beira district, Beira, -12.1906, *Swynnerton 931* (K); Road to Moebede, -1.1948, *Faulkner 181* (K); Gaza district, Chonguene, Campo de Ensaios, -7.1949, *Myre* (K, NU); Inhambane district, entre Inhambane e Miramar, -9.1948, *Myre and de Carvalho 185* (K, NU); Lourenço Marques district, N. Inhaca Island, Delagoa Bay, -7.1959, *Watnough 389* (K); Quelimane district, -8.1950, *Munch 260* (K).

MADAGASCAR—-1841, *Perville 660* (K); -1867, *Boivin s.n.* (K); Beravi -7.1879 *Hildebrandt 3069* (K); Central -10.1881, *Baron 479* (K); -10.1882, *Baron 1437, 1545* (K); North-west, -1887, *Baron 5240, 5504* (K); Betriraha, -12.1889, *Scott-Elliott 2218* (K); -1889, *Baron 5440* (K); -5.1912, *Methuen s.n.* (K); Majunga, Marovoay, -6.1912, *Afzelius s.n.* (K); Tmerimandrose, -6.1921, *Decary 418* (K); -11.1930, *Lam & Meeuse 5540* (K); Fort Dauphin, -10.1932, *Decary 10796* (K); Anivorano, -11.1959 *Schlieben 8044* (K).

MAURITIUS—-1837, *Bojer/Bouton s.n.* (MAU); -10.1862, *Ayres s.n.* (K); -1864, *Bouton s.n.* (K); -1867, Fl. Mauritius 1 (K); -1892, *Bojer s.n.* (K); -1892, Fl. Mauritius 8 (K); *Vaughan 7B* (K); -2.1931, *Vaughan s.n.* (MAU); Midlands, -1.1953, *Roche couste s.n.* (MAU); Pandr d'Or, -1.1954, *Roche couste s.n.* (MAU); Pandr d'Or, -1954, *Roche couste s.n.* (MAU); *Wiehe s.n.* (MAU); border of Perrier Nature Reserve, -3.1973, *Bajjnath 856* (IU, MAU); in Perrier Nature Reserve, -3.1973, *Bajjnath 857* (IU, MAU); Midlands, -3.1973, *Bajjnath 865* (IU, MAU).

NATAL—2632 (Bella Vista): near Maputa and Big Kosi Lake (-CD), -5.1948, *Rodin 4672* (K).

—2732 (Ubombo): Ingwavuma, Kosi Bay (-AA), —.9.1961, *Edwards* 2560 (K); Lake Sibayi (-BC), —.2.1958, *Tinley* 68 (NH, NPB); Mpangazi Lake (-CA), —.1.1964, *Strey and Huntley* 5023 (NU, PRE).

—2831 (Nkandala): Eshowe (-CD), —.4.1949, *Lawn* 544 (NH); Mtunzini, Ngoya Mountain (-DD), —.1962, *Venter* 109 (NU); Ngoye, —.3.1907, *Wood* 10421 (NH, PRE); Ongoye area, —.9.1956, *F. Bayer s.n.* (NU); Garland's Farm, —.11.1969, *Bajinath* 659 (IU); Umlalazi Nature Reserve (-DD), —.5.1919, *Mogg* 4310 (PRE); —.1.1959, *Guy and Ward* 55, (K, NH, NPB); —.1.1964, *Huntley* 817 (PRE); Isingisi Lake, —.5.1955, *Ward* 2608 (NH, NPB, NU).

—2832 (Mtubatuba): Dukuduku (-AA), —.9.1964, *Strey* 5567 (NU, PRE); Ubisana Valley, —.7.1962, *Venter* 80 (NU); Mpati (-AD), —.11.1969, *Bajinath* 663 (IU); Richards Bay (-CC), —.1.1949, *Ward* 715 (NU, PRE).

—2930 (Pietermaritzburg): Inanda (-DB), —.7.1881, *Wood* 1331 (K); Durban (-DD), —.2.1883, *Rehmann* 8623 (K); Clairmont, —.2.1887, *Wood s.n.* (K, NH); Clairwood Race Course, —.2.1969, *Bajinath* 667 (IU); Merebank East, —.8.1965, *Ward* 5266 (NU, PRE); Merebank South West, —.8.1969, *Bajinath* 625 (IU); ponds near Umlaas River, —.1840, *Krauss* 165 (K); Isipingo North, —.8.1948, *Ward* 469 (NU).

—2931 (Stanger): Talmadges Pan (-BA), —.11.1969, *Bajinath* 657 (IU); Greenwood Park (-CC), —.1.1914, *Wood* 1016 (PRE).

—3030 (Port Shepstone): Scottburgh South (-BC), —.2.1970, *Bajinath* 703 (IU); Umzinto, Umzinto-Park Rynie Road, —.2.1970, *Bajinath* 682 (IU); Ellingham Farm, —.2.1970, *Bajinath* 698 (IU); Park Rynie, roadside, —.2.1970, *Bajinath* 701 (IU); Park Rynie Beach, —.2.1970, *Bajinath* 702 (IU); Marburg, off Harding Road (-CB), —.1.1970, *Ganga* 1 (IU); —.2.1970, *Strey* 9562 (K); Shelley Beach (-CD), —.5.1970, *Bajinath* 745, 748 (IU); Margate, —.2.1931, *Rump s.n.* (NH); —.2.1967, *Nicholson* 479 (NH); Southbroom (4 km south of Ramsgate), —.2.1970, *Bajinath* 718 (IU); Palm Beach area, —.2.1970, *Bajinath* 720 (IU); Hibberdene, Umhlungwa River south (-DA), —.11.1971, *Bajinath* 838 (IU); Turton, Umfazazaan River south (S. of Isipofu turn-off), —.2.1970, *Bajinath*, 710, 715 (IU); Anerley, —.2.1970, *Bajinath* 716 (IU).

—3130 (Port Edward Garage (-AA), —.2.1970, *Bajinath* 721 (IU).

C. prolifer occurs on the eastern and south-eastern coasts of Africa and on several islands off the east coast of Africa and appears to be a tropical species which extends to a southern limit in the vicinity of the Umzimvubu River. Its distribution may well be limited by the influence of the warm Agulhas Current. Populations in Natal are all from low-lying areas, the highest being 100 m above sea-level (Adams Mission).

The species is hygrophilous, preferring well-aerated habitats near streams or drinking holes with running water where, in the absence of competition, it may form dense stands resembling beds of diminutive papyrus. *C. prolifer* is, however, intolerant of shading and of stagnant conditions and if drainage is severely

impeded, the population exhibits sterile inflorescences and considerable vegetative reproduction in the form of proliferations from bract axils or ray tips. If stagnation is prolonged, the population may be restricted to the fringes of the stagnant area. If culms are trampled or lodged by floods, the plants multiply by vegetative proliferation within a short while.

In Natal, there appear to be two similar, possibly related taxa, which are described in the following paper (Baijnath, 1976).

ACKNOWLEDGEMENTS

Grateful appreciation is extended to the Directors of Herbaria for the loan of material for this study; to Mr Raynal for his interest and assistance and to the Director of the Herbarium, Paris for the loan of the type specimen of *C. prolifer* Lam.; to Mrs Mulder for technical assistance and to Dr K. D. Gordon-Gray for her helpful comments on the preparation of the manuscript.

One of us (H.B.) acknowledges with gratitude the financial support of the South African Council for Scientific and Industrial Research and the South African Sugar Association, and a Travel Grant to Mauritius from the S.C.D.I.F.A. and Maistry Educational Trusts.

REFERENCES

- BAIJNATH, H., 1976. Studies in Cyperaceae in Southern Africa: 8. Two new species of *Cyperus* L. (In press).
- BOECKELER, O., 1862–4. In: Peters, *Reise nach Mossambique*. Botanik, 538, Berlin.
- , 1868. Die *Cyperaceen* des königlichen Herbariums zu Berlin. *Linnaea* **XXXV**: 577–.
- CLARKE, C. B., 1883. In: Baker, On Flora of Madagascar. *J. Linn. Soc. (Bot.)*, **20**: 287.
- , 1884. On Indian species of *Cyperus*. *J. Linn. Soc. (Bot.)* **21**: 123.
- , 1895. In: T. Durand and H. Schinz, *Conspectus Florae Africae ou énumération des plantes d'Afrique*. Bruxelles, Berlin, Paris. **5**: 565, 572, 578.
- , 1897. In: W. T. Thiselton-Dyer, *Flora Capensis*. VII.
- , 1901. In: W. T. Thiselton-Dyer, *Flora of Tropical Africa*. VIII.
- KÜKENTHAL, G., 1936. Cyperaceae – Scirpoideae-Cypereae. In: A. Engler (ed.), *Pflanzenr.* **101**: 11, 256. Leipzig.
- KUNTH, C. S., 1837. *Enumeratio Plantarum* **2**: 37.
- POIRET, J. L. M., 1806. *Encyclopédie méthodique*. Botanique, **7**: 270.
- VAHL, M., 1806. *Enumeratio plantarum* **2**: 320.